LoadShedder

INSTALLATION AND SERVICE MANUAL

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WARNING

The *LoadShedder* is an electronic unit that is fed with both 12 volt DC and 120 volt AC power. The potential for lethal electrical shock exists whenever you access the interior of the *LoadShedder*. In addition, a wayward screwdriver in the box could short out and damage the control module. Before entering the enclosure be sure that you disconnect all power that feeds into the unit. Any service work performed inside this unit should be performed by qualified technicians familiar with electrical components.

If your *LoadShedder* is equipped with 120 volt quick disconnect fittings be sure to switch off the AC power at the circuit breakers before connecting or disconnecting these fitting. It's also recommended to remove the 12 volt fuse that powers the *LoadShedder* to prevent any damage to the unit while attempting to service the unit or configuring it.

Read this manual in it's entirety before attempting any service or setup work to familiarize yourself with it's operation and any setup, connection, or diagnostic procedures.

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SHORE POWER OVERVIEW

The *LoadShedder* is designed to eliminate tripped pedestal breakers. RV parks provide shore power at most sites. This can come in three basic sizes – 20 amp, 30 amp, and 50 amp. The 20 amp is generally not used because it's too small to run anything but the most minimal loads. However there are times when this is all that is available and is needed to keep the RV's batteries charged. 20 amp circuits use the standard duplex receptacle that most everyone is familiar with from residential wiring.

30 amp shore power uses a special 3 prong 30 amp RV style plug. The standard for years, it's been eclipsed by larger 50 amp supplies because today's RVs have greater electrical requirements than those of earlier years. The 30 amp feed is a single pole 120 volt feed, producing 3,600 watts.

50 amp shore power uses a 4 prong 50 amp plug. It's actually a 120/240 volt split phase supply. To an RV this means that it receives two separate 50 am feeds, producing a total of 12,000 watts. This is a huge improvement over the smaller 30 amp feeds and is more than adequate to operate even the most power hungry RVs.

Not all RV parks have 50 amp service. Many times an RVer will need to connect to a 30 amp shore power supply. In that case a 50 amp to 30 amp adaptor, commonly called a dogbone is used to plug your 50 amp cord end into a 30 amp outlet.

Dogbone Adaptor

The big problem with 30 amp shore power occurs whenever you exceed 30 amps. You may be running your air conditioner(s) and other items but as soon as the thermostat kicks in the electric hot water heater element, you exceed 30 amps and the 30 amp breaker on the pedestal trips. The same holds true when using the microwave. If you don't manually shut down some of the extra loads, such as switching off one of the air conditioners, you won't be able to operate your microwave without tripping the pedestal breaker.

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PRODUCT DESCRIPTION

The *LoadShedder* corrects this issue by managing your power consumption automatically. It will display the actual power consumption at that instant on the remote display ammeter and manage your power consumption so that your pedestal breaker no longer trips, saving you numerous trips to the pedestal to reset the breaker. It consists of two separate units – the *LoadShedder* module and enclosure itself as well as a remote display monitor panel. The *LoadShedder* is intelligent and knows which type of power is being supplied to the RV, whether it be 30 amp, 50 amp, or from your generator. It then makes intelligent power management decisions based on those parameters and displays any status information on the remote display monitor panel.

Remote Display Monitor Panel

The remote display monitor panel is the only interface that the RVer will need to see. The actual module is pre-programmed during setup and commonly resides directly behind the existing AC breaker panel in an area that does not need regular access. The monitor panel will display the service type currently in use, the current draw in amps, and the on/off status of any circuits that are sheddable. A small pushbutton is also located on the panel to toggle between 20 amp and 30 amp modes. More on that later.

Up to four AC circuits are routed from the AC breaker panel, through relays in the *LoadShedder's* main module. In addition there are two more low voltage relays designed to control any low voltage loads, such as air conditioner compressors, thermostats, or low voltage relays that control AC devices, such as hot water heater relays. The relays will open up and remove the various circuits according to a user defined load shedding order so that the total load does not exceed the capacity of the supply.

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OPERATION MODES

The decisions made by the *LoadShedder* are all performed in the Intellitec module located inside the *LoadShedder's* UL approved enclosure. It is capable of determining what kind of power feed is present by testing for certain input parameters and performing the appropriate management tasks accordingly. Following are the various modes of operation.

50 amp Shore Power Mode:

Whenever an RV is plugged into a 50 amp shore power outlet, there will be two poles or "hot" legs present. The voltage between these two poles will be 240 volts. This is the only time that 240 volts will be present. The control module tests for the presence of 240 volts between L1 and L2. If it sees this, it will operate in 50 amp mode and the appropriate LED will illuminate on the remote display monitor. It is not possible to measure accurate AC amperage in this mode so the ammeter will be blanked out and will not display any amps. All of the power status LEDS will remain illuminated and no load shedding will occur. At this level of power supply there is no need to shed any loads.

120 volt Generator Power Mode:

When your RV is powered by it's on-board generator set, a 12 volt signal is sent from the generator's hourmeter or start-stop switch to a terminal on the *LoadShedder's* control module. When this terminal receives a 12 volt DC signal at this terminal it knows that the generator is powering the vehicle. In this mode the "generator" LED will illuminate on the remote display monitor. No load shedding will be performed but the ammeter will display how many amps are being consumed from your generator.

Note: Most RVs use generators of 7,500 watts or less. These units are wired "in phase" so they product 120 volts. Larger generators can be used in larger RVs and can be 10,000 watts or more. In this case they will be wired in "split phase", which is 120/240 volts. If you have a larger 10KW generator the *LoadShedder* will still continue to ignore any load shedding tasks but the ammeter will be blanked out on these larger generators.

30 amp or 20 amp Shore Power Mode:

When plugged into a 30 amp or 20 amp shore power outlet, there will only be one pole of "hot" power present. It will be wyed to both sides of the breaker panel box but, because they are in "like phase", the *LoadShedder* will not see 240 volts across L1 and L2. Whenever the module detects zero voltage across L1 and L2, but 120 volts from L1 to Neutral and also from L2 to Neutral, and also a lack of 12 volt DC power at the generator signal input it knows that it is on either 30 amp or 20 amp shore power. Most likely it will be 30 amp shore power so the *LoadShedder* will enter the 30 amp shore power mode automatically. In this mode load shedding will be accomplished. A "30 amp" LED will illuminate on the remote display monitor. If you are plugged into a smaller 20 amp service, you will need to manually press the "20/30" button to toggle over to the 20 amp mode. The "20 amp" LED will them illuminate. In either mode load shedding will occur and the current usage will be displayed on the ammeter. The only difference is at which level the shedding will occur – either 20 or 30 amps. Whenever a load is shed, that circuit's LED will blank out on the monitor panel. Whenever it is restored, it will illuminate once again.

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LOAD SHEDDING OPERATION

When the system is initially powered up, every circuit is energized in one second intervals. Each circuit is measured and it's amperage value is stored in memory. If you are operating in the 30 amp mode it will test the total amperage used and if you have exceeded that threshold the module will begin to shed some circuits according to your predetermined load shedding order until the total current draw drops below the maximum load threshold. Eventually the amperage will drop even lower as the excess load is removed. The module will then test to see if it can restore some of the previous shed circuits (in reverse order from when it shed them) by testing each circuit's stored amperage value to see if it's safe to bring it back on line again. If it is, it will restore that circuit. Following the user defined shedding order ensures that the least important circuits will be shed first and restored last while the most critical circuits will be shed last and restored first.

Once the *LoadShedder* determines that there is sufficient current availability to restore a previously shed circuit, it will wait for two minutes before restoring that circuit. That will prevent air conditioners from kicking in too quickly if their compressors have a full head pressure and also prevents any unnecessary chattering of relays kicking on and off repeatedly. In essence, it makes sure that this condition is stable before making it's move. During this two minute "wait" cycle the LED for that circuit will flash, indicating that it is about to be restored. Once the circuit is restored the LED will be steadily illuminated.

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PLANNING YOUR INSTALLATION

The most important step is to plan your load shedding scheme carefully before proceeding. Proper planning will eliminate any concerns or "redo" work later that can result from poor planning or lack of planning. So, take the time to think about things now before you begin.

AC versus DC Loads:

It's fairly obvious that the *LoadShedder* can be used to switch up to four AC circuits from your breaker panel. But, there are also two low voltage relay contact sets that you may or may not want to use also. You don't have to use them but by using them you increase your load shedding ability to six circuits or devices.

You can do two things with the low voltage relay contacts. You can either control a relay that controls an AC circuit or you can directly control a low voltage device.

For instance, most RVs have a combination electric/propane powered hot water heater. While some RV manufacturers connect the electric element directly to a 120 volt outlet, some manufacturers incorporate a small low voltage relay to operate that outlet. This gives them the advantage of being able to mount a small low voltage switch someplace in the coach rather than having a large bulky switch. The same holds true for engine block heaters on diesel powered coaches. By controlling these relays with the *LoadShedder's* low voltage relays you free up two of the AC circuit relays for other items. Note – you don't have to control them this way but it may be to your advantage so give it some thought.

The second thing you can do is directly control a low voltage circuit. The most common usage of that is by controlling your air conditioner's compressor. Most air conditioners have a pair of wires in them that are unused. They control a relay to that air conditioner's compressor. If you use one of your *LoadShedder's* low voltage relays to control those two wires, then you can shed the compressor from the system but still allow the circulating fan to operate. The compressor is where most of the amps are going anyway and you still retain some air movement this way. The disadvantage is that you need to fish a pair of low voltage wires to the rooftop unit, which isn't always so easy to do once the RV is built.

AC circuits are simple. They just switch off power to the device via one of the four AC relays in the main module. You can control air conditioners, refrigerators, hot water heaters, or any other AC device in this manner.

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Determining Your Specific Load Shedding Scheme:

Step one is to decide which loads you want to shed. Then prioritize them. List your low priority loads (first to shed) at the top of the list and your high priority loads (last to shed) at the bottom of the list. Next, enter them into the following list. You may want to make a copy of this page or at least use pencil so that you can reuse this sheet if you ever decide to make changes later on. Remember – you don't have to use all six circuits. If you just want to plug in four simple AC circuits, that's fine too. Remember to list the least important loads at the top and the most important at the bottom of the list:

LOAD NAME (First Load Shed at Top)	**Load Type**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
		D	**A**	**A**	**A**	**A**	**D**	**A**	**A**
		D	**D**	**A**	**A**	**A**	**A**	**D**	**A**
		A	**D**	**D**	**A**	**A**	**D**	**A**	**D**
		A	**A**	**D**	**D**	**A**	**A**	**D**	**A**
		A	**A**	**A**	**D**	**D**	**A**	**A**	**D**
		A	**A**	**A**	**A**	**D**	**A**	**A**	**A**

Table 1 – Load Shedding Worksheet

Next, fill in the second column with the type of load that you will be controlling. Enter an "A" if it's a 120 volt AC circuit or a "D" if it's a 12 volt DC circuit and you want to use one of the low voltage DC relays to control that circuit.

Once you have that, look across the rest of the table to find out which column your "A"s and "D"s line up with. Take note of the number (1 through 8) from that column's heading and remember it so that you can use it on the next table to determine which DIP switch settings you will need to make on the main control module.

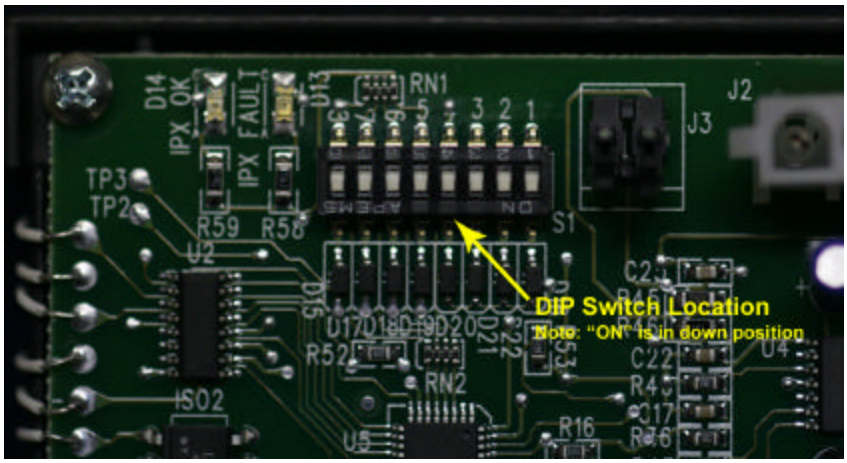
Entering Your Shedding Schedule into the Control Module:

Taking your specific heading number (1 through 8) from the previous table, look at the following table to determine which DIP switch settings you will need to make on the main control module.

COLUMN NUMBER	1	2	3	4	5	6	7	8
S1-1	ON	OFF	ON	OFF	ON	OFF	ON	OFF
S1-2	ON	ON	OFF	OFF	ON	ON	OFF	OFF
S1-3	ON	ON	ON	ON	OFF	OFF	OFF	OFF
RELAY SHED ORDER (Top is first shed)	6	4	4	4	4	6	4	4
	5	6	3	3	3	4	6	3
	4	5	6	2	2	5	3	6
	3	3	5	6	1	3	5	2
	2	2	2	5	6	2	2	5
	1	1	1	1	5	1	1	1

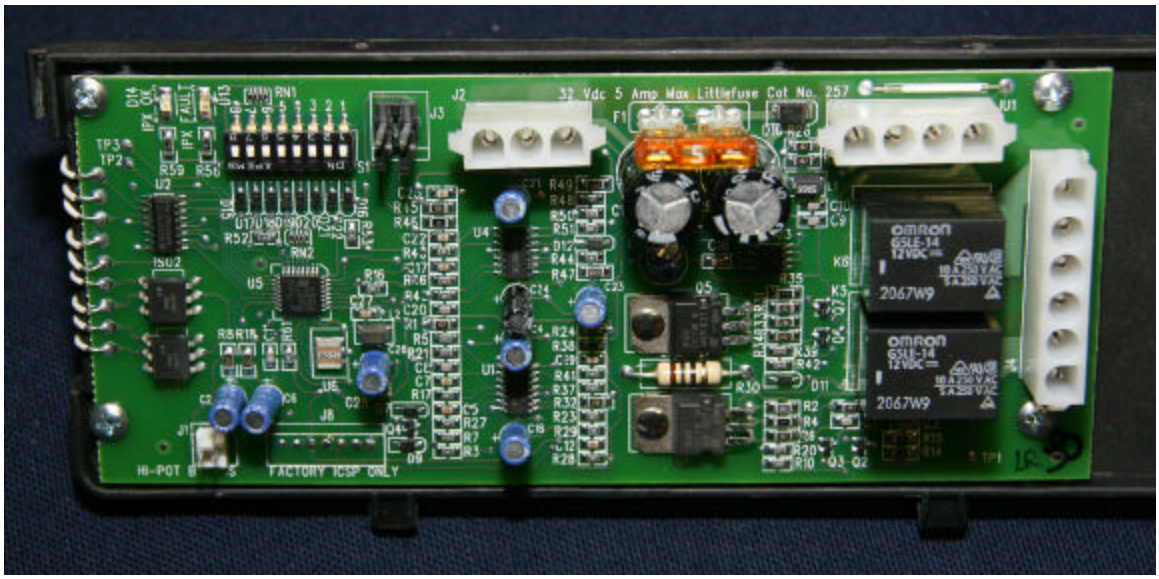
Table 2 – DIP Switch Settings Table

The control module has an 8 position DIP switch mounted on the surface of the board. It's identified in the image below. The switches in positions 1 through 3 determine the load shedding order. Switch # 4 determines if EMS shedding is enabled for the generator while switch #5 determines the size of the generator. Switches #6 thru 8 are not used at this time. By default all of these switches are on and you only need to concern yourself with the first three DIP switches in order to establish a load shedding order.



DIP Switch Location

If you turn switch # 4 to the OFF position you will enable load shedding when in generator operation mode. If you do use enable this you will also need to set switch # 5 to identify the size of the generator. If switch #5 remains in the ON position the generator's output will be limited to 45 amps, which is approximately 5,400 watts. If you set switch #5 to the OFF position it will be limited to 60 amps, which is approximately 7,200 watts. Under most conditions this is not necessary so we recommend that you leave switches # 4 and 5 in the default ON position.



DC Side of Control Module

At the bottom of Table 2 you'll notice a relay shed order. This determines which circuits get connected to which relay. Be sure to connect the right load to the right circuit or else they won't be shed in the proper order.

Extremely Important Note!

In order for the control module to operate correctly it must receive power from both sides of the main breaker panel. Breaker panels have two sides to them. Each pole of a 50 amp shore power feed goes to a different side. Circuit #1 must be connected to one side of the panel while circuit #2 must be connected to the other side. It doesn't matter where the third and fourth circuits come from but circuits #1 and 2 must be on opposing phases within the box in order for it to detect 50 amp shore power and function properly. It may be necessary to swap positions with a pair of circuit breakers in your main breaker panel.

Be sure to consider this when planning your load shedding arrangement

Final Considerations:

Consider where you want to install your *LoadShedder*. The module itself is typically stashed behind the existing breaker panel, which is many times underneath the refrigerator or mounted in a decent sized cavity. It doesn't take up that much room and once it's configured it's pretty much forgotten.

The remote display monitor panel is generally mounted in an easy to see location so that you can monitor the status of your *LoadShedder*. It is fed a small low voltage wiring harness so it can be mounted in any convenient location.

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INSTALLATION PROCEDURE

Okay, now that the planning and configuring has been done, it's time to install the system.

Running the Low Voltage Power Wires:

Once you know where everything is going to be, it's best to run your low voltage wires first. You'll need to provide a fused 12 volt hot feed, a ground lead, and a generator run signal wire to the *LoadShedder*. These are all low voltage wires and a pigtail harness is provided with the system. 12 volt fuse panels are generally in the same location as the AC breaker panel and there is generally a grounding lug nearby, most likely mounted to the backside of the AC breaker panel so those two are easy to run. The third wire needs to receive a signal from the generator whenever it is running. This is commonly referred to as the B+ wire, which is hot with 12 volts whenever the generator is operating. This wire feeds the red pilot light on any generator start-stop switch and also feeds a remote hourmeter that tracks the generator's total running time. So, all you need to do is find the shortest route and easiest way to tap into one of those wires. That will complete the 3 wires to the J2 terminal connection that you need to operate the *LoadShedder*. **DO NOT** let the circuit be live until the *LoadShedder* is fully installed. Remove the 12 volt fuse that powers that circuit until all of your connections have been made.

Installing and Connecting the Remote Display Monitor Panel:

Next you need to mount the remote display monitor panel. You'll need to cut a hole in a wall, dash panel, or cabinet someplace to install the remote display. The hole needs to be 2-1/8" x 3-3/4" in size. Included is a 25' cable assembly to connect the remote display to the *LoadShedder*. If you need to locate the remote farther away you may do so by cutting the wires and splicing in additional wiring. Be sure to use #16 wire when extending the remote display to prevent signal loss that may occur with lighter gauge wiring. The remote display panel may be connected up to 100' from the *LoadShedder*. Plug the 3 pin end of the cable into the back of the remote display panel and the 4 pin end into terminal J3 on the *LoadShedder's* main control module. Mount the display to the wall with two #6 flat head screws.

Implementing Low Voltage Relays:

If you choose to utilize the low voltage relays #5 through 6 you'll need to run wiring to them. A pigtail has been provided that connects to terminal J4 on the main control module. You can extended these wires to wherever the relays are they you want to control. If you will not be using these relays you will not need to connect the wiring harness to J4 at all.

Connecting the Current Sensor:

In order to determine just how much power is being used when not in the 50 amp mode, a small transformer is used. This current sensor needs to be installed into the main breaker panel and the main neutral buss wire must pass through it. Before you do this be sure to kill all power to the coach. Unplug any shore power cords, switch off any inverters, and be sure that any automatic generator start is disabled if so equipped. If not you will be exposing yourself to dangerous high voltage inside the breaker panel, which could have lethal consequences.

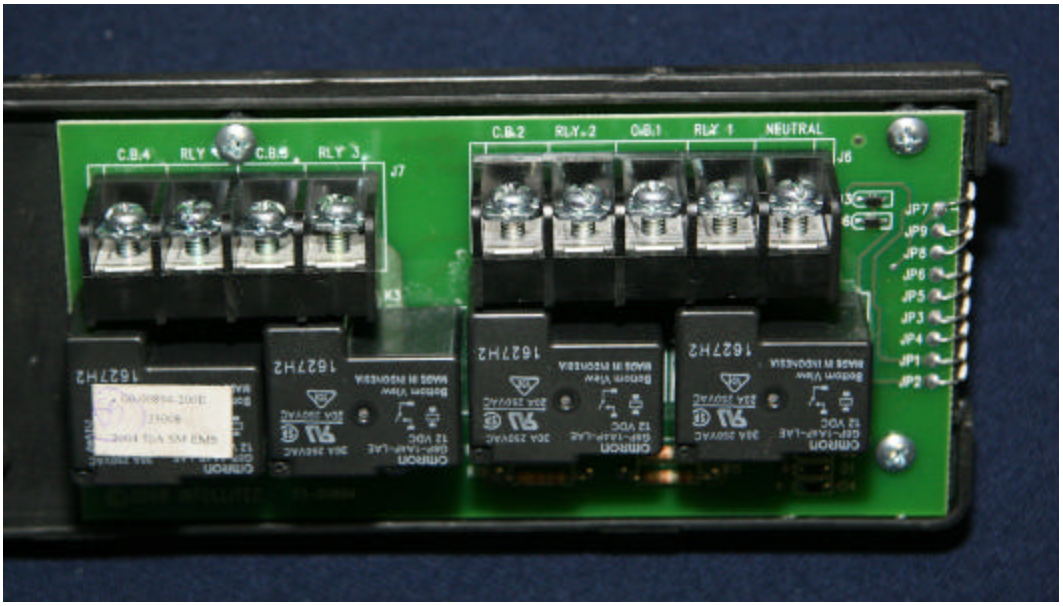
Once inside the main breaker panel, remove the main neutral wire that runs from the main power feed to the neutral buss bar, from the buss bar. Slip the current loop transformer over that wire and reconnect the neutral wire to the buss bar. Run the transformer's small leads out the back of the breaker panel. You may have to remove an existing knockout or you may be able to pass it through an existing opening that has some room left in it. Plug the other end into the terminal jack on the *LoadShedder's* main control module.

Current Sensor

Connecting the 120 Volt AC Lines:

Finally, you need to connect the 120 volt lines. Identify which lines carry the circuits that you want the *LoadShedder* to control by tracing that circuit's breaker to the 120 volt cable leaving the rear of the main breaker panel. If there is a quick disconnect available, release it and insert the leads from the LoadShedder into those connections. Be sure that the wires from the breaker panel go to the "in" cables on the *LoadShedder* and the wires leading to the circuits connect to the "out" cables on the *LoadShedder*.

If you do not have quick disconnects or desire to locate the *LoadShedder* in a far away location you will either have to obtain some extra connectors to attach to your coach's wiring or else remove the included quick disconnect whips and run your existing AC cables directly into the *LoadShedder*. If you do remove the whip cables be sure to refer to the wiring diagram to ensure that you are connecting your cables to the correct AC relays.



120 Volt AC Relay Side of Control Module

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FINAL TESTING AND POWER UP

Perform a Quick Checklist:

1. Are the DIP switches configured to the precise load shedding profile that you want?
2. Are all of the AC circuits properly connected and plugged in?
3. Is the remote display monitor plugged in at both ends?
4. Do you have 12 volt hot, ground, and generator set B+ wires connected?
5. Is the transformer correctly installed?
6. Is the main breaker panel reinstalled in it's location?

If all of the above conditions are positive, it's time to power up the *LoadShedder*.

Power Up the System:

1. Plug in your shore power cord to a 20 or 30 amp receptacle.
2. Restore 120 volt AC power to the coach.
3. Install the fuse into the 12 volt circuit that feeds the LoadShedder.

The *LoadShedder* will now power up. If nothing happens you have an installation issue which needs to be addressed. Refer to the troubleshooting chart near the back of this manual for assistance.

If the system does power up, you may hear relays clicking on inside the main module and your remote display panel will illuminate. If you are indeed on a 20 or 30 amp shore power feed then the ammeter will display your current draw. If you are plugged into a 50 amp feed the ammeter will be blank.

At this point we recommend not using a 50 amp feed because it won't be possible to test the system's load shedding functions.

Testing the System:

Once you are operating in the 30 amp shore power mode increase your energy demands on the system. Start adding loads, such as air conditioners, hot water heaters, etc until you exceed the 30 amp threshold. Once you exceed 30 amps you should see the first LED on the list go out and the amps will drop accordingly. Continue on adding more loads and you'll see even more LEDs go out as the circuits drop from the grid.

Then, begin to restore circuits. Remember that there's a 2 minute delay until a circuit is re-energized. During that delay you may see the LED for that circuit flash. Once the circuit comes back on line the LED will remain permanently lit.

Finally, disconnect your shore power and start up the generator set. You should be able to power the coach with your generator set and also see the amperage displayed on the remote display if you have a 120 volt (7,500 watt or less) generator set.

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JUNCTION TERMINAL PINOUTS

J1 = 2 pin Molex KK-100 Connector – HI-POT TEST Power Up

Pin 1 Hi-Pot Override
Pin 2 Hi-Pot Override

J2 = 3 pin Amp Mate-n-Lok Connector – Power Connector

Pin 1 12 Volts Power Supply
Pin 2 Generator Run, 12 Volts Input
Pin 3 Chassis Ground

J3 = 2 pin Molex KK-146 – Current Transformer Connector

Pin 1 Current Sensor Input
Pin 2 Current Sensor Input

J4 = 6 pin Amp Mate-n-Lok Connector – Control Relays 5 & 6 Contacts

Pin 1 Relay 5 Normally Open (NO)
Pin 2 Relay 5 Common (C)
Pin 3 Relay 5 Normally Closed (NC)
Pin 4 Relay 6 Common (C)
Pin 5 Relay 6 Normally Closed (NC)
Pin 6 Relay 6 Normally Open (NO)

Note:
Relays 5 & 6 are NOT energized at power up. Their contacts will remain Normally Closed between J4 pins 2 & 3 and J4 pins 4 & 5.

J5 = 4 pin Amp Mate-n-Lok Connector – Communications to Remote Display Panel

Pin 1 Power
Pin 2 Data In
Pin 3 Ground
Pin 4 RV/PMC Master Out

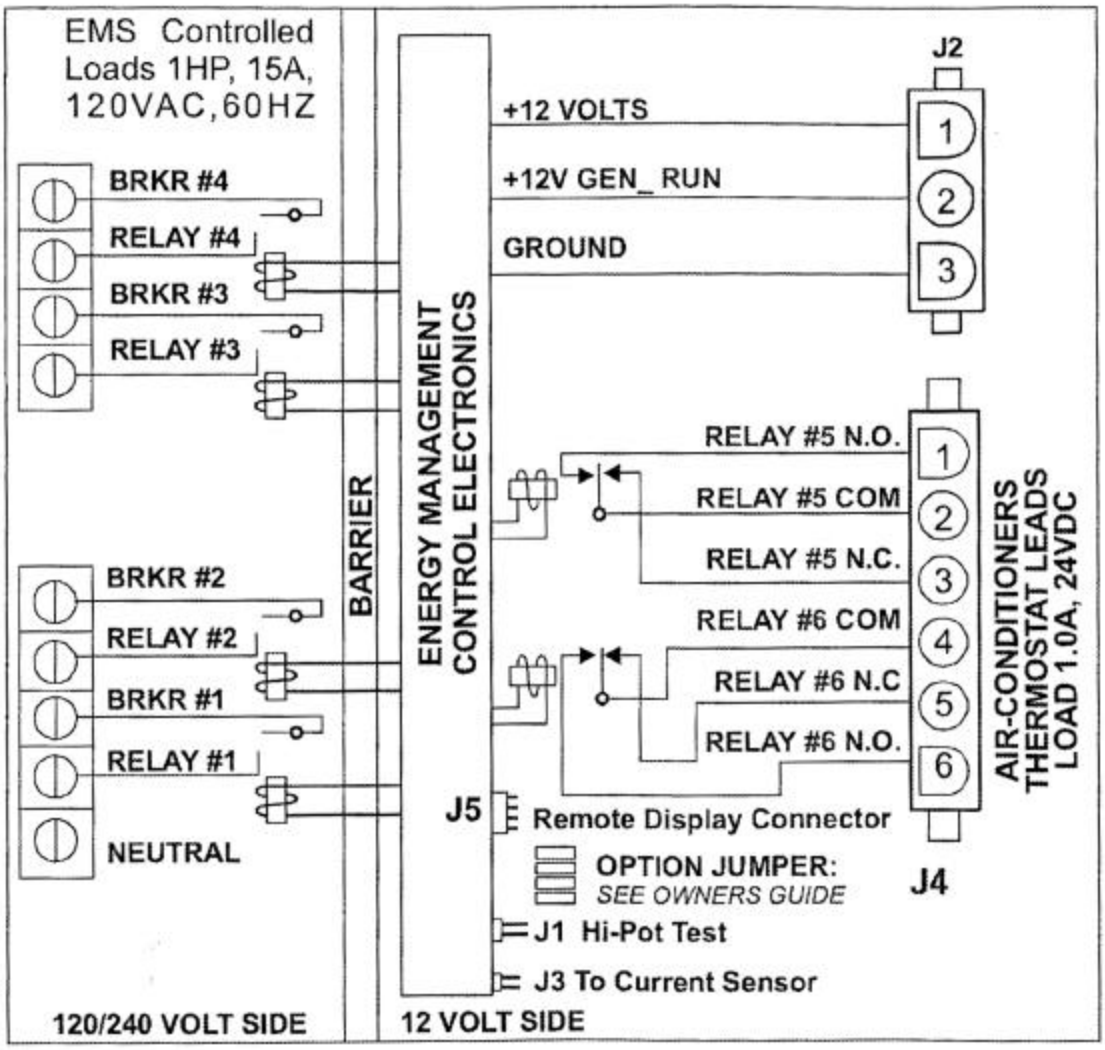
J6 = 5 Position AC Terminal Block

Terminal 1 (B2) Relay 2 – Input From Circuit Breaker (Must be connected to a LINE 2 Breaker)
Terminal 2 (C2) Relay 2 – Output to Load
Terminal 3 (B1) Relay 1 – Input From Circuit Breaker (Must be connected to LINE 1 Breaker)
Terminal 4 (C1) Relay 1 – Output to Load
Terminal 5 (N) Neutral connection

J7 = 4 Position AC Terminal Block

Terminal 1 (C3) Relay 3 – Output to Load
Terminal 2 (B3) Relay 3 – Input From Circuit Breaker
Terminal 3 (C4) Relay 4 – Output to Load
Terminal 4 (B4) Relay 4 – Input From Circuit Breaker (Must be connected to LINE 1 Breaker)

CONTROL MODULE CONNECTIONS DIAGRAM



Note: The EMS control module is fitted with a 5 amp ATO style fuse to protect the control module's circuitry. Do not replace this fuse with a higher rating or serious damage to the circuitry could occur.

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TROUBLE SHOOTING

Note: Be sure to follow these steps in sequential order when troubleshooting the *LoadShedder*

I. No 120 volt appliances operating:

A. Check incoming power source:

1. Make sure that the shore power cord is plugged into the outlet.
2. Verify that the 120 volt quick disconnect connectors are fully connected between the *LoadShedder* and the breaker panel and output wiring runs.
3. Check the shore power pedestal breaker to see that it is on. Verify this by switching it off and then back on again.
4. Check the main 50 amp breakers in your RV's breaker panel to be sure they are on. Cycle them off and then back on again to make certain.
5. Test the voltage at the 30 amp shore power receptacle with a voltmeter to ensure that the receptacle is live.

B. Check the RV's transfer switch:

1. Measure the voltage at the incoming side of your RV's main breaker panel. You should have 120 volts between each 50 amp main breaker's output terminal and the neutral buss bar. If you do not have voltage present at these locations you have an open circuit between your shore power cord's plug and the main breaker panel. This generally results from a defective transfer switch.

II. 120 volts is present at appliances not powered by the LoadShedder but none of the LoadShedder controlled circuits operate:

A. Check the 12 volt power to the *LoadShedder*:

1. Unplug the 3 conductor terminal J2 from the control module. Test for 12 volts DC power from the red wire to a good ground. If no power is present, check the fuse that controls this power supply to see if it's blown.
2. Test for 12 volts DC between the red wire (hot) and the black wire (ground) on the J2 pigtail. If you have 12 volts in step 1 above but not between the red and black wires you have a bad ground and need to attach the other end of the black wire to a good ground and retest.

B. Check the 120 volt circuit breakers in your breaker panel.

1. Reset the circuit breakers to verify that they are set.
2. Check for 120 volts AC power between the circuit breakers and the neutral buss bar. If no power present, replace the circuit breakers.
3. Check for presence of 120 volts at the *LoadShedder's* AC relay output terminals (C1, C2, C3, C4).
4. Check to verify that the neutral wire that connects the *LoadShedder's* neutral terminal (N) to the neutral buss bar is installed.

III. Some controlled appliances power up while others do not:

A. Reduce your total power consumption. It's possible that some circuits may be shed to keep the total draw under 30 amps.

B. Check the wiring to and from the EMS control module:

1. Check the wiring from the circuit breakers to the EMS control module inputs (B1, B2, B3, B4).
2. Check the wiring from the EMS control modules outputs (C1, C2, C3, C4) to the appliances.
3. Check for power at both the input and output terminals of the EMS relay that controls the dead circuit.

IV. The circuit breaker trips whenever power is applied to that circuit:

A. Check for a short in the wiring.

V. Air conditioner doesn't work:

A. Check the thermostat wiring and settings to be sure that it's calling for cooling.

VI. The shedding order is incorrect:

A. Check the DIP switch settings on tables 1 and 2.
B. Check that the circuits are connected to the proper relays.

VII. Remote display is dead or displaying strange characters:

A. Check the green "IPX OK" and red "IPX Fail" LED indicators on the EMS control module. If communications is present between the remote display and the control module the green "IPX OK" LED will be illuminated. Check your wiring between J5 on the EMS control module and the remote display for continuity.

B. If communications is not present between the EMS control module and the remote display the red "IPX Fail" LED will be illuminated instead. Check the wiring for shorts to ground or to another circuit. The correct voltages are shown in the table below:

Pin	Function	Voltage
1	Power	12 volts
2	Data In	Approx 9 volts
3	Ground	Ground
4	RV/PMC Master Out	Approx 9 volts

Note: Both the EMS control module and the remote display have internal protection. Shorts or mis-wiring should not cause the units to fail.

VIII. Remote display does not indicate “GEN SET” service source when generator is running:

A. Check wiring between the generator run light circuit and green wire on terminal J2 on the EMS control module. There should be approx 12 volts DC present between the green wire and ground whenever the generator is running and no power whenever the generator is off.

B. If your generator produces 240 volts (generally a 10,000 watt generator or larger) the “50 AMP” service source LED may illuminate instead. In this case no energy management functions are enabled and the ammeter is blanked out.

IX. Remote display does not indicate “50 AMP” service source when 50 amp 240 volt shore power is connected:

A. Check to verify that one of the hot feed lines (either B1 or B2) to terminal J6 (which contains AC relays 1 and 2) connects to the L1 side of the main breaker panel while the other (B1 or B2) terminal connects to the L2 side of the breaker panel. EMS relays 1 and 2 must be connected to opposing sides of the breaker panel in order to test for 240 volts.

B. With 50 amp shore power service there should be 240 volts AC between B1 and B2 of terminal J6. When on 30 amp shore power there should be 0 volts present between B1 and B2 and there should be 120 volts AC present when either B1 or B2 are tested to the neutral buss bar or the “N” terminal on J6.

C. Check to verify that the neutral jumper is in place between the neutral terminal (N) on J6 and the neutral buss bar.

Load Shedder Installation and Service Manual

SPECIFICATIONS

Main Unit:

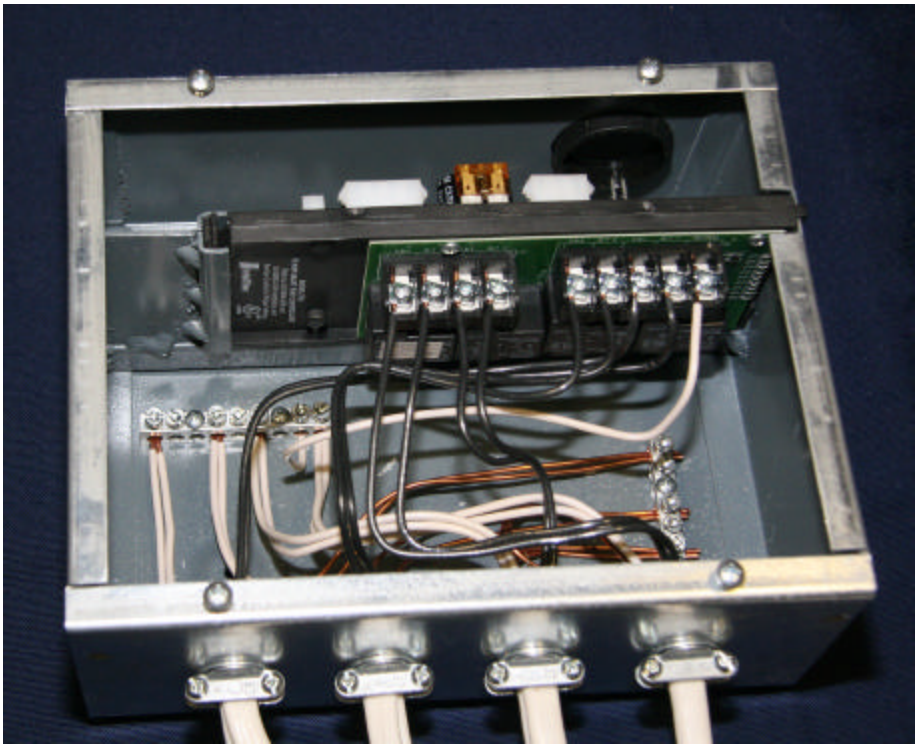
Enclosure Construction: Galvanized Steel with Removable Cover, UL Approved
Physical Size: 10”W x 8”D x 4”H
120 VAC Wiring: #12, Rated at 20 amps per Circuit
AC Wiring Connectors: Pigtails with Molex 600VAC, 20A Rated Connectors
Control Module: Intellitec 700 Series Smart EMS
Maximum Controllable Loads: Six, Selected During Setup Configuration from Six Relays
AC Relays: (4), 120 VAC 60 HZ, 1 HP, 15A Rating
DC Relays: (2), 12-24 VDC, 1.0A Rating
Ambient Temperature Range: -40C to +85C

Remote Display Panel:

Intellitec LED Display with LED Ammeter

Included in Kit:

LoadShedder Main Unit w/ Quick Disconnect Wiring Pigtails
Remote Display and Monitor Panel
Current Sensor
6’ Wiring Pigtail w/ Protective Loom for 12VDC Power
25’ Connection Cable for Remote Display
12’ Wiring Pigtail for Low Voltage Relays
3’ Plastic Wiring Loom, 3/4” Diameter



Load Shedder Installation and Service Manual

SAMPLE LOAD SHEDDING SCHEMES

Configuration #1:

Gasoline Powered Motorhome, Dual Air Conditioners, Propane/Electric Hot Water Heater, Propane/Electric RV Style Refrigerator.
Uses Column 5 DIP Switch Setting from Table 2.

First Circuit Shed = Bedroom Air Conditioner
Second Circuit Shed = Refrigerator
Third Circuit Shed = Electric Hot Water Heater
Fourth Circuit Shed = Front Air Conditioner

This configuration is the easiest to install. It uses no DC relays and is a simple plug and play for four AC circuits. The refrigerator will automatically switch over to propane operation while that circuit is shed and the hot water heater can be used in propane mode should continuous hot water be required during load shedding.

Configuration #2:

Diesel Powered Motorhome, Dual Air Conditioners, Propane/Electric Hot Water Heater, Propane/Electric RV Style Refrigerator, Plus an Additional AC Circuit.
Uses Column 6 DIP Switch Setting from Table 2.

First Circuit Shed = Engine Block Heater
Second Circuit Shed = Refrigerator
Third Circuit Shed = Electric Hot Water Heater
Fourth Circuit Shed = Front Air Conditioner
Fifth Circuit Shed = Rear Air Conditioner
Sixth Circuit Shed = (Available)

This configuration requires a few extra connections and also uses the two DC relays in addition to the four AC circuits. The DC relays are used to control the low voltage relays and switches that operate the electric water heater and the engine block heater, thereby freeing up two AC relays for other applications. The first circuit shed is the engine block heater via a DC relay. Next, the refrigerator will be shed and automatically switch over to propane operation until that circuit comes back on line. The hot water heater is plugged into a low voltage relay controlled outlet so we use the *LoadShedder's* second DC relay to control that. The two air conditioner circuits follow that and we still have another AC relay available if you have any other loads that you would like to shed. If not, this relay can remain unused.

Another option would be to use the last AC relay to control the water heater so that you don't have to run low voltage wiring to the relay that controls the outlet for the water heater. In that case you would use a different DIP switch configuration as per tables 1 and 2.

Configuration #3:

Diesel Powered Motorhome, Three Air Conditioners, Residential Refrigerator, Aqua Hot Hydronic Heating.
Uses Column 2 DIP Switch Setting from Table 2.

First Circuit Shed = Center Air Conditioner
Second Circuit Shed = Engine Block Heater
Third Circuit Shed = Electric Element in Aqua Hot System
Fourth Circuit Shed = Front Air Conditioner
Fifth Circuit Shed = Rear Air Conditioner
Sixth Circuit Shed = (Available)

This configuration also uses the two DC relays in addition to the four AC circuits. The DC relays are used to control the low voltage relays and switches that operate the Aqua Hot's electric heating element and the engine block heater. The first circuit shed is the center air conditioner. The second circuit shed is the engine block heater via a DC relay. Next, the electric heating element for the Aqua Hot's boiler will be shed via a low voltage DC relay. The two air conditioner circuits follow that and we still have another AC relay available if you have any other loads that you would like to shed. If not, this relay can also remain unused. Residential refrigerators are powered via the coach's inverter so they do not require energy management and are not a consideration in this configuration.

Another option would be to use the last AC relay to control the Aqua Hot's electric heating element so that you don't have to run low voltage wiring to the Aqua Hot or it's remote switch panel. In that case you would use a different DIP switch configuration as per tables 1 and 2.

Configuration #4:

Factory Installed System, Dual Air Conditioners, Propane/Electric Hot Water Heater, Propane/Electric RV Style Refrigerator.
Uses Column 7 DIP Switch Setting from Table 2.

First Circuit Shed = Refrigerator
Second Circuit Shed = Rear Air Conditioner Compressor
Third Circuit Shed = Electric Element in Hot Water Heater
Fourth Circuit Shed = Front Air Conditioner Compressor
Fifth Circuit Shed = Rear Air Conditioner Fan
Sixth Circuit Shed = Front Air Conditioner Fan

This configuration is the hardest to install because it requires running low voltage wiring to each of the rooftop air conditioners. Each rooftop unit has a pair of wires that can shut down the air conditioner's compressor unit when jumpered. This is designed to interface with an energy management system so we'll utilize that feature in this configuration. Air conditioner's consume the most power when the compressor is engaged. The circulating blower uses minimal power so by disengaging the compressor temporarily we drastically reduce the current demand while still providing air circulation.

In this configuration we'll disconnect the compressors via the *LoadShedder's* DC relays in stages 2 and 4. Finally, the blowers themselves can be shut down if needed in stages 5 and 6.

ELECTRICAL SCHEMATIC